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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/540,732	KATHIRGAMANATHAN ET AL.	
	Examiner	Art Unit	
	Marie R. Yamnitzky	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 February 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *56-70* is/are pending in the application.

4a) Of the above claim(s) *56-60 and 63-66* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *61,62 and 67-70* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. This Office action is in response to applicant's amendment filed February 23, 2009, which amends the specification, cancels claims 33-55 and adds claims 56-70.

Claims 56-70 are pending.

2. The objection to the disclosure for informalities, as set forth in the Office action mailed August 21, 2008, is overcome by amendment.

All rejections set forth in the August 21st Office action are rendered moot by claim cancellation.

3. Newly submitted claims 56-60 and 63-66 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

The originally examined claims were directed to an electroluminescent diiridium compound and an electroluminescent device comprising the compound.

The present claims are directed to a method for forming an electroluminescent device (Group I, claims 56-60), an electroluminescent device (Group II, claims 61-62), a method for preparing an electroluminescent compound (Group III, claims 63-66), and an electroluminescent compound (Group IV, claims 67-70).

The method of claims 56-60 is related to the compound of claims 67-70 as a process of using the compound, and the method of claims 63-66 is related to the compound of claims 67-70 as a process of making the compound. The methods of claims 56-60 and 63-66 are not directly

related to the device of claims 61-62 because the methods of claims 56-60 and 63-66 do not directly provide the device of claims 61-62.

Further, this application was filed under 35 U.S.C. 371, and the present claims are directed to inventions not so linked as to form a single general inventive concept under PCT Rule 13.1. The inventions listed as Groups I-IV do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The feature in common to Groups I-IV is an iridium compound having the general chemical formula shown in each of independent claims 56, 61, 63 and 67. This feature does not represent a contribution over the prior art as evidenced by Tsuboyama et al. (US 2003/0152802 A1), and therefore does not constitute a special technical feature. (Although Groups II and IV do not relate to a single general inventive concept under PCT Rule 13.1, these two groups will continue to be examined together since claims having similar limitations were examined together in the previous Office action.)

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 56-60 and 63-66 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Withdrawn process claims will be considered for rejoinder if a product claim is subsequently found to be allowable. See MPEP 821.04(b) for the conditions necessary for rejoinder of withdrawn process claims. (Note, for example, that if present claims 61 and 62 were

found to be allowable, but claims 67-70 were not, none of the presently withdrawn process claims would be rejoined.)

4. Claim 70 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 70 is directed to a compound and requires the compound to exhibit electroluminescence at certain X and Y color coordinates. Applicant refers to the table of Fig. 19 for support. The X and Y color coordinates set forth in the table of Fig. 19 are the color coordinates exhibited for a particular electroluminescent device structure at certain voltages. The data set forth in the table in Fig. 19 does not pertain to a compound per se.

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 67-70 are rejected under 35 U.S.C. 102(e) as being anticipated by Tsuboyama et al. (US 2003/0152802 A1).

See the entire patent application publication. In particular, see Fig. 1A-1D, paragraphs [0001]-[0005], [0008]-[0009], [0015], [0027]-[0035], [0037] and [0065] (especially formulae 15, 20-26, 31 and 32 on pages 7-8), and compound Nos. 211-217, 222, 223 and 269 as defined in Tables 5 and 6 (pp. 10-11).

Each of Tsuboyama's metal coordination compound Nos. 211-217, 222, 223 and 269 are electroluminescent iridium compounds having the general chemical formula set forth in present claim 67 wherein each of L_1 and L_2 is selected from phenylpyridine and substituted phenylpyridines, and each of R_1-R_4 is an aliphatic group. With respect to the recitation in claim 67 of "capable of being vacuum-evaporated onto a substrate for use as an electroluminescent layer", it is reasonable to expect that Tsuboyama's compound Nos. 211-217, 222, 223 and 269 inherently have this capability. Tsuboyama's compounds are taught for use in an electroluminescent layer, and vacuum deposition is utilized in some of Tsuboyama's device examples. Although Tsuboyama does not provide a device example in which one of compound Nos. 211-217, 222, 223 and 269 is vacuum deposited, it is reasonable to expect that any of these compounds is capable of being vacuum deposited. Further, Tsuboyama's compound No. 211 is applicant's compound of Example 3, which is capable of being vacuum-evaporated onto a substrate for use as an electroluminescent layer.

With respect to the further limitations of claim 68, Tsuboyama's compound Nos. 211-217, 222, 223 and 269 are compounds wherein R_1 to R_4 are alkyl.

With respect to claim 69, it is the examiner's position that it is reasonable to expect that at least Tsuboyama's compound Nos. 211-216 and 269 are inherently capable of exhibiting green

electroluminescence. Compound No. 211 is applicant's compound of Example 3, which is capable of exhibiting green electroluminescence, and given the specific substituents on the substituted phenylpyridine ligands of compounds Nos. 212-216 and 269, it is reasonable to expect that these compounds would also inherently be capable of exhibiting green electroluminescence.

With respect to claim 70, Tsuboyama's compound No. 211 is a compound according to the present claim wherein L_1 and L_2 are each phenylpyridine. Since Tsuboyama's compound No. 211 is applicant's compound of Example 3, and applicant's compound of Example 3 was used to make a device exhibiting electroluminescence at the color coordinates specified in claim 70, Tsuboyama's compound Nos. 211 is inherently capable of the same.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 61 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuboyama et al. (US 2003/0152802 A1) as applied to claims 67-70 above, and further in view of Kathirgamanathan (WO 98/58037).

Tsuboyama's metal coordination compounds are disclosed for use in the luminescence layer of an organic luminescence device comprising a luminescence layer positioned between an

anode and a cathode. Each of prior art compound Nos. 211-217, 222, 223 and 269 meets the limitations of the iridium compound required for the device of present claims 61 and 62.

Tsuboyama et al. do not disclose mixing the iridium compounds with an electroluminescent europium complex. Electroluminescent europium complexes within the scope of those required for present claims 61 and 62 were known in the art at the time of the invention. Kathirgamanathan discloses such europium complexes. For example, see Examples 6-10 on pages 9-13 of WO '037. The europium complex required by present claim 62 is the complex of Example 6 in WO '037. Further, it was known in the art at the time of the invention that more than one light-emitting material could be used in combination so as to alter the color of light emitted by the device. For example, Kathirgamanathan teaches on page 6 that mixtures of electroluminescent metal complexes can be used to modify the color of emitted light. Absent a showing of unexpected results commensurate in scope with present claims 61 and 62, it is the examiner's position that it would have been a *prima facie* obvious modification to one of ordinary skill in the art at the time of the invention to use combinations of known electroluminescent materials, such as the iridium compounds taught by Tsuboyama et al. and the europium complexes taught by Kathirgamanathan, in the luminescence layer of an EL device.

9. Applicant's arguments filed February 23, 2009 that are applicable to the rejections as applied against the new claims have been fully considered but they are not persuasive.

Applicant argues that Tsuboyama provides only a few specific examples of compounds that were actually synthesized and tested. Applicant argues that not all of the compounds

encompassed by Tsuboyama's general formula or defined in Tsuboyama's tables can be successfully prepared using methods taught by Tsuboyama or otherwise known in the art. Applicant further argues that not all of Tsuboyama's compounds will produce sufficient luminescent effect under normal operating conditions.

Applicant further argues that Tsuboyama provides no detailed description for synthesizing any compound of the type claimed in the present application, and "no synthesis route is even suggested." Applicant further argues that nothing in Tsuboyama indicates whether the quadridentate ketone-based ligand (the ligand of Tsuboyama's formula 15 on page 7) will have appropriate electroluminescent properties. Applicant argues that electroluminescent properties cannot be reliably predicted and can be ascertained only by experiment.

While Tsuboyama does not provide a specific example in which any of compound Nos. 211-217, 222, 223 and 269 is synthesized, Tsuboyama does provide a general reaction scheme (see paragraphs [0081]-[0084]). The examiner notes that the synthesis example provided in the present specification differs somewhat from Tsuboyama's scheme in that applicant takes the product of Tsuboyama's scheme (1) and reacts directly with a diacac ligand (corresponding to Tsuboyama's L'), but it is the examiner's position that one of ordinary skill in the art at the time of the invention, being motivated to produce Tsuboyama's compounds having the diacac ligand of Tsuboyama's formula 15 would be able to determine through routine experimentation the steps necessary to produce such compounds. It is the examiner's position that one of ordinary skill in the art at the time of the invention would recognize that when the L' ligand is diacac, there is no need for the intermediary step of Tsuboyama's scheme (2).

With respect to applicant's arguments regarding electroluminescent properties, when one of skill in the art works on developing electroluminescent metal complexes (or electroluminescent materials in general), one is not working in a mental vacuum. For example, one of ordinary skill in the art would be aware of electroluminescent metal complexes that have previously been made and successfully used in electroluminescent devices. Electroluminescent properties are not totally unpredictable. For example, there is knowledge in the art (as evidenced by prior art of record) that different substituents and patterns of substitution on a phenylpyridine ligand can influence the peak emission wavelength emitted by the compound.

With respect to applicant's arguments that Tsuboyama does not indicate whether the diacac ligand would have appropriate electroluminescent properties, Tsuboyama's compounds are taught for use as electroluminescent compounds. Further, the iridium compound $Ir(ppy)_2acac$ was known in the art at the time of the invention to be suitable for use as an electroluminescent compound, as were substituted derivatives having substituents on the phenylpyridine ligands. Tsuboyama's compound No. 211 is essentially two molecules of $Ir(ppy)_2acac$ linked together by a single bond connecting the acac ligand of each of the two molecules, and compounds such as Nos. 212-217 are substituted derivatives thereof wherein the phenylpyridine ligands have a substituent on each phenylpyridine ligand. It is not clear to the examiner why applicant thinks one of ordinary skill in the art would look at Tsuboyama's disclosure of compounds such as No. 211 and not think that they would be suitable for the purposes taught by Tsuboyama.

With respect to the rejection under 35 U.S.C. 103(a) based on Tsuboyama and Kathirgamanathan, applicant argues that Kathirgamanathan does not make up for the deficiencies

of Tsuboyama, and neither reference teaches nor suggests forming electroluminescent layers with both an iridium compound according to the present claims and an europium complex. The examiner's position regarding applicant's argued deficiencies of the Tsuboyama reference is as set forth above. Regarding the combination of iridium complex and europium complex as required for the present device claims, the prior art references demonstrate that, at the time of the invention, the iridium complex required for the device was taught for use as a light-emitting material in an electroluminescent device, the europium complex required for the device was taught for use as a light-emitting material in an electroluminescent device, and it was known in the art that more than one light-emitting material could be used in combination to alter the color of light emitted from an electroluminescent device. While the present specification teaches that the iridium complex can be used in combination with an europium complex, no working example of such a device is provided that might provide evidence of unexpected results. The claimed device requires a combination of light-emitting materials that were known in the art at the time of the invention, and no objective evidence of unexpected results obtained by the combination of known materials has been provided.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 7:00 a.m. to 3:30 p.m. Monday and Wednesday-Friday.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

/Marie R. Yamnitzky/
Primary Examiner, Art Unit 1794

MRY
June 07, 2009